

# Industrial Minerals and Metals Publications of the Illinois State Geological Survey

through December 1989

Compiled by Jonathan H. Goodwin, Donald G. Mikulic,  
and James W. Baxter



Department of Energy and Natural Resources

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## FOREWORD

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This annotated bibliography includes Illinois State Geological Survey (ISGS) publications on the mining and processing of nonfuel industrial and metallic minerals and rocks in the state (at the ISGS, fuel materials, i.e., coal and oil and gas, are categorized separately and hence are not included here).

The industrial prosperity of Illinois depends on the mining and processing of industrial minerals and metals. Although relatively low in total value, industrial minerals and metals are the backbone of the construction industry and the foundation of our mineral-based economy. According to 1987 estimates, the value of nonfuel industrial and metallic minerals mined and processed in Illinois (\$789.5 million) constituted about 25 percent of the combined value of fuel and nonfuel materials produced and processed in Illinois.

Since its origin in 1905, the ISGS has maintained a vigorous program of research and service dealing with the geology, location and extent, physical and chemical properties, processing and refining, and uses of the industrial and metallic mineral resources of the state. The results of these studies have been transmitted to the mineral industries, governmental agencies, planners, and the general public through numerous technical and nontechnical publications in the ISGS' own publication series and in refereed scientific journals. The ISGS first prepared a lightly annotated list of its publications dealing with nonfuel mineral resources in 1966 and has periodically updated that listing since then. This revised and expanded bibliography replaces *Illinois Mineral Notes 69*, which was published in 1979.

This new bibliography is more comprehensive than past listings. More publications of a general nature are listed, many dealing with stratigraphy, depositional environments, and geochemistry of Illinois rocks—subjects of growing importance in the exploration for mineral deposits. A few publications are included in which mineral resource subjects are a relatively minor part of the publication. This bibliography includes publications released through December 1989. Publications are listed by mineral commodity, as well as other headings. Articles that include discussions related to more than one industrial or metallic mineral commonly are listed under each appropriate heading.

Publications of the ISGS are available for a nominal cost, which is shown in the listing. Information on shipping and handling charges is given at the back of this publication, along with a tear-out order form. A list of all ISGS publications with complete price information is available free upon written request. Out-of-print publications, designated with an asterisk in this listing, may be consulted at the ISGS library and in other libraries; some may be borrowed directly from ISGS for limited periods. Out-of-print publications in the Reprint series are not available for loan, but many libraries will have the scientific journal in which the reprinted article originally appeared (the original journal citation is included in this listing).

All materials published by the ISGS are in the public domain, and authors are free to include ISGS figures, tables, maps, or other materials in their publications. We ask that the ISGS be acknowledged each time material is used. If the material has been amended, it should be stated in the acknowledgment.

In addition to its publications, the ISGS has extensive reference material: well logs, field notes, unpublished work copies of maps, unpublished manuscripts, and photographs. You are invited to telephone, write, or visit the Survey to make inquiries.

## **GLOSSARY**

### **Abbreviations of Publication Series:**

B, Bulletin

C, Circular

C/G, Contract Grant

EGN, Environmental Geology Notes

ES, Educational Series

GB, Guidebook

IMN, Illinois (or Industrial) Mineral Notes

IP, Illinois Petroleum

MEB, Mineral Economics Brief

MIB, Mining Investigations Bulletin

R, Reprint (includes year and letter designation, e.g., R 1955-L)

RI, Report of Investigations

Annotations are in *italics*.

## COMMODITIES

### Barite

- \*C 179 Short papers on geologic subjects. Barite in the La Salle Limestone of Illinois. 1952. p. 126-128, 3 figures (reprinted from Transactions of the Illinois State Academy of Science, v. 44, p. 126-128, 1951). *Chiefly of significance to mineralogists or collectors.*
- C 265 Barite in the southern Illinois fluorspar district. 1959. 14 p., 1 figure, 1 table. *Occurrence, distribution, and uses.* \$1.75

### Brine

- C 244 Brine disposal in Illinois oil fields. 1957. 12 p., 2 figures, 3 tables. \$1.75.
- \*C 393 The origin of saline formation waters. II. Isotopic fractionation by shale micropore systems. 1965. 32 p., 8 figures, 2 tables. *See R 1966-I.*
- \*C 397 The origin of saline formation waters. III. Calcium chloride waters. 1966. 60 p., 15 figures, 6 tables.
- IP 66 Illinois oil-field brines—their geologic occurrence and chemical composition. 1952. 38 p., 13 figures, 1 table. \$0.65.
- R 1958-N Source and occurrence of brines for waterflooding in Illinois. 1958 (reprinted from Transactions of the Illinois State Academy of Science, v. 50, p. 180-186, 1957). \$1.00.
- \*R 1963-C Possible mechanism for concentration of brines in subsurface formations. 1963 (reprinted from American Association of Petroleum Geologists Bulletin, v. 47, no. 2, p. 257-269).
- \*R 1966-I The origin of saline formation waters. I. Isotopic composition. 1966. 14 p., 10 figures, 2 tables (reprinted from Journal of Geophysical Research, v. 71, no. 16, p. 3869-3882). *See C 393.*

### Cement-Making Materials

- \*B 8A (Extract from B 8, 1908). Cement making materials in the vicinity of La Salle. 8 p., 1 plate. Concrete materials produced in the Chicago district. 1908, 28 p., 1 figure.
- B 17 Portland-cement resources of Illinois. 1912. 121 p., 19 plates, 3 tables. \$2.40.
- \*IMN 12 A survey of some Illinois materials possibly useful as pozzolans. 1961. 6 p., 1 table.
- R 1966-M Geology of cement raw materials in Illinois. 1966 (reprinted from Proceedings of the Second Forum on Geology of Industrial Minerals, p. 45-71. Indiana Geological Survey and Indiana University Department of Geology). \$1.00.
- RI 195 Preliminary report on Portland cement materials in Illinois. 1956. 34 p., 3 figures, 3 tables. \$1.75.

### Chert

- \*C 245 Petrography and origin of Illinois nodular cherts. 1957. 25 p., 2 figures, 2 plates, 2 tables. *Cherts are epigenetic concretions.*
- C 468 Properties of chert related to its reactivity in an alkaline environment. 1972. 31 p., 2 plates, 6 figures, 6 tables. \$1.75.
- IMN 59 The distribution and physical properties of chert gravel in Pike County, Illinois. 1974. 21 p., 7 figures, 3 tables, appendix. *Resources of Cretaceous Hadley gravel and Pleistocene-Holocene stream-valley gravels for use as construction aggregate; includes data on roundness, abrasion resistance, soundness, water absorption, specific gravity, and chemical composition; maps show distribution of gravel types.* \$1.25.

Commodities (continued)

- RI 166 Siliceous materials of extreme southern Illinois—silica, novaculite, ganister, calico rocks, and chert gravels. 1953. 39 p., 17 figures, 11 tables. \$0.90.

Clay

- \*B 4 Year Book for 1906. Preliminary investigation of Illinois fire clays. 1907. p. 129-175, 1 map, 3 figures, 1 table. *Resources, especially in extreme southern Illinois, chemical analyses, and pyrometric tests.*
- \*B 8E (Extract from B 8, 1908). Statistics and directory of the clay industries. 12 p.
- \*B 9 Paving brick and paving brick clays of Illinois. 1908. 318 p., 3 plates, 33 figures. *Clay deposits, qualities of clays and bricks, and brick pavements.*
- B 17 Portland-cement resources of Illinois. 1912. 121 p., 19 plates, 3 tables. *Raw materials, including clays in selected areas; cement manufacture.* \$2.40.
- B 30 Biennial report for 1913 and 1914. Pennsylvanian fireclays of Illinois. p. 61-73, 2 figures. Geology and economic resources of Colchester and Macomb Quadrangles. 1917. p. 75-108, 2 figures, 1 plate, 8 tables. \$2.40.
- \*B 36A (Extract from B 36, 1920). Clay deposits near Mountain Glen, Union County, Illinois. 15 p., 2 figures.
- B 38D (Extract from B 38, 1922). Investigations of Illinois fire-clays. 149 p., 14 figures, 1 table. *Deposits in 20 counties, methods of testing, ceramic tests.* \$2.40.
- \*B 38F (Extract from B 38, 1922). Notes on Illinois bituminous shales, including results of their experimental distillation. 20 p., 4 figures, 17 tables. *Occurrences in eight counties; distillation tests.*
- B 43A (Extract from B 43, 1923). Geology and mineral resources of the La Harpe and Good Hope Quadrangles. 89 p., 1 plate, 11 figures, 2 tables. *Limestone, sand and gravel, and clay resources in portions of Hancock, McDonough, Henderson, and Mercer Counties.* \$3.40.
- \*B 43B (Extract from B 43, 1923). Geology and mineral resources of the Morris Quadrangle. 114 p., 3 plates, 32 figures, 4 tables. *Limestone, sand and gravel, and clay resources in the Morris Quadrangle of Grundy and Kendall Counties).*
- B 43C (Extract from B 43, 1923). Geology and mineral resources of the Kings Quadrangle. 100 p., 3 plates, 34 figures, 1 table. *Limestone, sand and gravel, and clay resources of the Kings Quadrangle in Winnebago and Ogle Counties.* \$3.40.
- B 69 Amenability of various types of clay minerals to alumina extraction by the lime sinter and lime-soda sinter processes. 1945. 77 p., 24 figures, 12 tables. \$2.40.
- \*C 14 Clay products industry in Illinois in 1935—preliminary report. 1936. 9 p., 11 tables.
- \*C 21 Clay products industry in Illinois in 1936—preliminary report. 1937. 12 p., 12 tables.
- \*C 23C (Extract from C 23, 1938). Current developments in clay and clay products. 54 p. Gumbotil as a potential source of rotary drilling mud, bonding clay, and bleaching clay. 1938. 23 p., 4 figures. \$0.90.
- \*C 45 Relation of the composition to the properties of clays. 1939. 11 p., 4 figures, 2 tables (reprinted from Journal of the American Ceramic Society, v. 22, no. 5, p. 141-151).
- \*C 49 Properties of clay. 1939. 30 p., 4 figures (reprinted from Recent Marine Sediments, American Association of Petroleum Geologists, Special Volume, p. 466-495).
- \*C 54 Some concepts of the relationship between the chemical compositions structures of clay minerals. 1939. 2 p. (reprinted from Transactions of the Illinois State Academy of Sciences, v. 31, no. 2, p. 130-131, 1938).

Commodities (continued)

- \*C 77 Predicting the behavior of clay. 1942. 6 p., 4 figures (reprinted from Brick and Clay Record, v. 97, no. 6, p. 20-22, December 1940).
- C 78 Directory of Illinois clay and clay products producers, January 1, 1942. 35 p., 6 figures. \$0.90.
- \*C 83 Halloysite clay in Illinois. 1942. 3 p. *Deposit in Pope County.*
- \*C 162 Olmsted fuller's earth and bonding clay for foundry use. 1950. 5 p., 3 tables.
- \*C 168 Reactions accompanying the firing of brick. 1951. 6 p., 4 figures, 2 tables.
- \*C 188 Ceramic materials from magnesium-treated clays. 1954. p. 165-168, 2 tables.
- C 203 Uranium in Illinois black shales. 1955. 15 p., 1 figure, 4 tables. \$1.75.
- \*C 208 Illinois oil shales. 1956. 22 p., 2 figures, 6 tables. *Oil content and other data on 120 samples.*
- C 233 Pottery clay resources of Illinois. 1957. 8 p., 2 figures. *Preliminary tests; general distribution.* \$1.75.
- C 266 Water-sorption characteristics of clay minerals. 1959. 20 p., 22 figures. *Data on kaolinite, illite, chlorite, and montmorillonite.* \$1.75.
- C 277 Light-burning clay resources in La Salle County, Illinois. 1959. 27 p., 3 figures. *Deposits, firing, and bonding tests.* \$1.75.
- C 282 Chemical and spectrochemical analyses of Illinois clay materials. 1959. 55 p., 2 tables. *Over 500 analyses.* \$1.75.
- C 286 Clay mineralogy of pre-Pennsylvanian sandstones and shales of the Illinois Basin. Part I: Relation of permeability to clay mineral suites. 1960. 20 p., 8 figures, 5 tables. *See C 287 and C 293.* \$1.75.
- C 287 Clay mineralogy of pre-Pennsylvanian sandstones and shales of the Illinois Basin. Part II. Clay mineral variations between oil-bearing and non oil-bearing sandstones 1960. 14 p., 4 figures, 2 tables. *See C 286 and C 293.* \$1.75.
- C 290 Lightweight aggregate from Illinois shales. 1960. 29 p., 2 plates, 2 figures, 2 tables. *Mineral and chemical composition; causes of bloating; tests on 76 samples.* \$1.75.
- C 293 Clay mineralogy on pre-Pennsylvanian sandstones and shales of the Illinois Basin. Part III. Clay minerals of various facies of some Chester formations. 1960. 19 p., 5 figures. \$1.75.
- C 302 Lower Pennsylvanian clay resources of Knox County, Illinois. 1960. 19 p., 1 figure. *Ceramic and bonding tests on 39 samples.* \$1.75.
- C 303 Ceramic tests of Illinois clays and shales. 1960. 72 p., 1 figure. *More than 125 tests of samples from 59 counties.* \$1.75.
- C 307 Chemical evaluation of Illinois oil shales. 1960. 22 p., 3 figures, 11 tables, appendix. *Detailed study of chemical and physical characteristics of products from the retorting of five samples.* \$1.75.
- C 322 Lower Pennsylvanian clay resources of Rock Island, Mercer, and Henry Counties, Illinois. 1961. 40 p., 1 figure. *Ceramic and bonding tests on 95 samples.* \$1.75.
- \*C 334 Stratigraphy and mineralogy of the Wisconsin loesses of Illinois. 1962. 55 p., 1 plate, 3 figures, 6 tables, 15 geol. secs. *Particle size, x-ray diffraction, major element composition, and other analyses of several hundred samples from across the state.*
- \*C 347 Mineralogy of glacial tills and their weathering profiles in Illinois. Part I: Glacial tills. 1963. 55 p., 9 figures, 6 tables, 8 stratigraphic sections. *See C 400.*
- C 352 Bluff-burning clay resources of southwestern and southern Illinois. 1963. 23 p., 4 figures, 3 tables, appendix. *Ceramic and bonding properties of 66 samples.* \$1.75.
- C 353 Bluff-burning clay resources of western Illinois. 1963. 23 p., 3 figures, 1 table, appendix. *Ceramic and bonding properties of 110 samples.* \$1.75.

Commodities (continued)

- \*C 371 Illinois clay resources for lightweight ceramic block. 1964. 15 p., 5 figures, 1 table. *Tests of seven shales and clays as bonding material for lightweight shale aggregate.*
- \*C 400 Mineralogy of glacial tills and their weathering profiles in Illinois. Part II: Weathering profiles. 1966. 76 p., 6 figures, 32 tables. *See C 347.*
- C 405 Long-term dimensional changes in Illinois bricks and other clay products. 1966. 44 p., 14 figures, appendix. \$1.75.
- \*C 422 Geology related to land use in the Hennepin region. 1968. 24 p., 10 figures, 2 tables. *Gives data on clay and shale.*
- C 427 Mineral zonation of Woodfordian loesses of Illinois. 1968. 44 p., 7 figures, 5 tables, appendix. \$1.75.
- \*C 429 Petrography of Pennsylvanian underclays in Illinois and their application to some mineral industries. 1968. 36 p., 7 figs, 3 tables, appendix.
- \*C 437 Glacial tills of northwestern Illinois. 1969. 47 p., 7 figures, appendix. *Stratigraphic relationships of tills defined, in part, on the basis of clay mineral suites.*
- \*C 438 Geology for planning in McHenry County. 1969. 31 p., 2 figures, appendix. *Some discussion of potential clay resources in glacial tills of the area.*
- C 442 Glacial geology of the Vandalia, Illinois, region. 1969. 23 p., 8 figures, 4 tables, appendix. *Glacial units differentiated, in part, on the basis of their clay mineral suites.* \$1.75.
- C 457 Old glacial drift near Danville, Illinois. 1971. 16 p., 3 figures, 1 table. *Pre-Illinoian tills differentiated, in part, on the basis of their clay mineralogy.* \$1.75.
- \*C 459 Glacial drift of the Shelbyville moraine at Shelbyville, Illinois. 1971. 24 p., 5 figures, 1 table. *Gives data on glacial clay.*
- C 460 Summary of the geology of the Chicago area. 1971. 77 p., 1 plate, 27 figures. *Includes data on clay and shale.* \$1.75.
- C 465 Geology for planning in St. Clair County, Illinois. 1971. 35 p., 8 plates, 4 figures, 8 tables. *Includes description of clay and shale resources.* \$13.75.
- C 478 Geology along the Illinois waterway: a basis for environmental planning. 1973. 48 p., 7 plates, 6 figures, 2 tables. *Includes discussion of potential clay and shale resources.* \$8.75.
- C 497 Geology for planning in the Springfield-Decatur region, Illinois. 1977. 76 p., 7 plates, 21 figures, 8 tables, appendix. \$8.75.
- C 510 Geology for planning in Rock Island County, Illinois. 1980. 35 p., 3 plates, 12 figures, 8 tables. \$5.75.
- C 518 The New Albany Shale Group in Illinois. 1981. 83 p., 4 plates, 53 figures, 5 tables, appendix. *Detailed stratigraphy and depositional environments of this widespread unit in Illinois.* \$5.75.
- C 531 Geology for planning in Boone and Winnebago Counties. 1984. 69 p., 21 figures, 7 tables, 3 plates. \$6.75.
- \*EGN 33 Geology for planning in De Kalb County, Illinois. 1970. 26 p., 6 figures.
- \*IMN 2 Lightweight brick from clay and peat or shredded corn cobs. 1955. p. 3-4.
- \*IMN 9 Shales as source material for synthetic lightweight aggregate. 1959. 5 p.
- \*IMN 11 Rare earth and trace element content of an unusual clay on Hicks Dome in Hardin County, Illinois. 1960. 6 p., 1 figure, 3 tables.
- \*IMN 12 A survey of some Illinois materials possibly useful as pozzolans. 1961. 6 p., 1 table. *Tests of 12 clays, 4 shales, and 2 silicas.*
- \*IMN 16 Refractory clay resources of Illinois. 1962. 4 p., 1 figure. *A general discussion.*
- \*IMN 18 Permanent expansion in bricks. 1964. 8 p., 4 figures. *Tests of Illinois brick showed expansion not acute.*
- IMN 19 Binding materials used in making pellets and briquets. 1964. 46 p. \$1.25.

*Commodities (continued)*

- \*IMN 22 Illinois clays as binders for iron ore pellets. 1965. 8 p., 1 figure, 4 tables. *Tests of seven clays showed promise.*
- IMN 26 Binders for fluorspar pellets. 1966. 9 p., 1 figure, 4 tables. \$1.25.
- \*IMN 28 Illinois clays as binders for iron ore pellets—a further study. 1966. 14 p., 1 figure, 8 tables.
- IMN 29 Clay and shale resources of Clark, Crawford, Cumberland, Edgar, Effingham, Jasper, and Vermilion Counties, Illinois. 1967. 23 p., 3 figures, 2 tables. \$1.25.
- IMN 30 Lightweight bricks made with clay and expanded plastic. 1967. 8 p., 1 plate, 2 tables. \$1.25.
- IMN 31 Clays as binding materials. 1967. 32 p. *Uses of different types of clay for binders are described.* \$1.25.
- \*IMN 33 A new use for Illinois clay materials in pesticide formulations. 1968. 13 p., 1 figure, 2 tables.
- \*IMN 36 Beneficiation of kaolinite clay from silica sand washings. 1968. 10 p., 2 figures, 5 tables.
- IMN 45 Clay and shale resources of Madison, Monroe, and St. Clair Counties, Illinois. 1971. 18 p., 3 figures, appendix. \$1.25.
- IMN 46 Sideritic concretions in Illinois shale, gravel and till. 1972. 17 p., 6 figures, 2 tables. \$1.25.
- IMN 49 Clay and shale resources of Peoria and Tazewell Counties, Illinois. 1973. 13 p., 3 figures, 2 tables, appendix. *Ceramic tests on 36 samples; identifies deposits with commercial potential.* \$1.25.
- IMN 55 The energy crisis and its potential impact on the Illinois clay products industry. 1974. 15 p., 2 figures, 1 table, appendix. \$1.25.
- IMN 77 Chemical analyses of western Illinois clay materials. 1980. 11 p., 1 figure, 1 table. \$1.25.
- IMN 102 Proceedings of the 23rd Forum on the Geology of Industrial Minerals. 1989. The history, geology, and future of industrial clays in Illinois. p. 59-70, 7 figures, 1 table. 1989. \$4.50.
- MIB 18 Tests on clay materials available in Illinois coal mines. 1917. 130 p., 62 figures. *Burning tests on 106 samples from 20 counties.* \$0.65.
- \*R 1955-D Quantitative estimations of clay minerals by diffraction methods. 1955. 10 p. (reprinted from *Journal of Sedimentary Petrology*, v. 24, no. 4, p. 242-251, 1954).
- \*R 1955-U The structural scheme of sepiolite. 1955 (reprinted from *American Mineralogist*, v. 40, no. 9-10, p. 885-892).
- \*R 1955-V X-ray diffraction criteria for the characterization of chloritic material in sediments. 1955 (reprinted from *Second National Conference on Clays and Clay Minerals Proceedings, National Academy of Sciences—National Research Council Publication 327*, p. 324-334).
- \*R 1956-E Clay mineralogy of some basal Pennsylvanian sandstones, clays and shales. 1956. 5 p., 4 figures (reprinted from the *Bulletin of the American Association of Petroleum Geologists*, v. 40, p. 750-754).
- \*R 1956-I Structural irregularities in hydrous magnesium silicates. 1956 (reprinted from *Third National Conference on Clays and Clay Minerals Proceedings, National Academy of Sciences—National Research Council Publication 395*, p. 94-102).
- \*R 1956-J Water sorption properties of homionic montmorillonite. 1956 (reprinted from *Third National Conference on Clays and Clay Minerals Proceedings, National Academy of Sciences—National Research Council Publication 395*, p. 186-204).
- \*R 1956-R Underclay squeezes in coal mines. 1956. 5 p., 4 figures, 6 tables (reprinted from *Mining Engineering*, v. 8, no. 10, p. 1024-1028). *Clay mineralogy in squeeze and nonsqueeze areas.*

*Commodities (continued)*

- \*R 1956-S The green compression strength of natural bentonites. 1956 (reprinted from Fourth National Conference on Clays and Clay Minerals Proceedings, National Academy of Sciences—National Research Council Publication 456, p. 41-44).
- \*R 1956-T Dehydration of monionic montmorillonites. 1956 (reprinted from Fourth National Conference on Clay and Clay Minerals Proceedings, National Academy of Sciences—National Research Council, Publication 456, p. 85-95).
- R 1957-L Controlling vanadium efflorescence. 1957. 2 p., 3 figures (reprinted from *Ceramic Age*, April 1957). *A use for fluorspar*. \$1.00.
- \*R 1958-BB Itinerary of field trip for Fifth National Clay Conference, 8 October 1956. 1958. 3 p. (reprinted from Fifth National Conference on Clays and Clay Minerals Proceedings, National Academy of Sciences—National Research Council Publication 566, p 1-3). *Describes three soil profiles; exposure of Fithian illite*.
- \*R 1958-CC Clay mineralogy of Pennsylvanian sediments in southern Illinois. 1958. 15 p., 6 figures, 1 table (reprinted from Fifth National Conference on Clays and Clay Minerals Proceedings, National Academy of Sciences—National Research Council Publication 566, p 227-241). *Environment of deposition and clay mineralogy*.
- \*R 1958-DD Temperature stabilities of montmorillonite- and vermiculite-glycol complexes. 1958 (reprinted from Fifth National Conference on Clays and Clay Minerals Proceedings, National Academy of Sciences—National Research Council Publication 566, p. 348-355).
- \*R 1959-E Current progress in silicate structures. 1959 (reprinted from Sixth National Conference on Clays and Clay Minerals Proceedings, Pergamon Press, New York, p. 18-25).
- R 1959-K Clay mineralogy as applied to secondary recovery problems. 1959. 4 p., 7 figures (reprinted from *Producers Monthly*, v. 23, no. 8, p. 32-36). \$1.00.
- \*R 1959-O Density of water sorbed on montmorillonite. 1959 (reprinted from *Nature*, v. 183, p. 1614-1615).
- \*R 1960-C A discussion of the water content of vermiculite. 1960 (reprinted from Seventh National Conference on Clays and Clay Minerals Proceedings, Pergamon Press, New York, p. 260-270).
- R 1961-I A mixed-layer clay mineral associated with an evaporite. 1961 (reprinted from Eighth National Conference on Clays and Clay Minerals Proceedings, Pergamon Press, New York, p. 228-236). \$1.00.
- \*R 1961-L Separation of clay minerals from carbonate rocks by using acid. 1961 (reprinted from *Journal of Sedimentary Petrology*, v. 31, no. 1, p. 123-129, 1960).
- \*R 1961-M Cretaceous-Tertiary clay mineralogy of the upper Mississippi Embayment. 1961 (reprinted from *Journal of Sedimentary Petrology*, v. 31, no. 1, p. 38-51, 1960).
- \*R 1961-O A clay mineral sequence at the Mississippian-Pennsylvanian unconformity in the Illinois Basin. 1961. 11 p., 6 figures, 1 table (reprinted from *Journal of Geology*, v. 69, no. 3, p. 341-351).
- \*R 1962-G Colloid phenomena in sedimentation of argillaceous rocks. 1962 (reprinted from *Journal of Sedimentary Petrology*, v. 31, no. 4, p 560-570, 1961).
- \*R 1963-L Contact temperature of a peridotite dike with Pennsylvanian shale determined by clay mineral alterations. 1963. 9 p., 5 figures, 1 table (reprinted from *Transactions of the Illinois State Academy of Science*, v. 56, no. 2, p. 59-67). *Indicates temperature of 525° to 550°C*.
- \*R 1965-R Clay materials and structural clay products. 1965. 6 p., 6 tables (reprinted from *American Ceramic Society Bulletin*, v. 44, no. 9, p. 663-668). *Mineralogy, chemical composition, organic matter, and chemical properties*.
- \*R 1965-T Middle and Late Pennsylvanian flint clays. 1965. 9 p., 6 figures (reprinted from *Journal of Sedimentary Petrology*, v. 35, no. 3, p. 610-618).

*Commodities (continued)*

- \*R 1967-K Clay fabric and its relation to structural properties in mid-continent Pennsylvanian sediments. 1967. 14 p., 8 figures, 3 tables (reprinted from *Journal of Sedimentary Petrology*, v. 37, no. 2, p. 610-623).
- \*R 1968-A Mixed-layer models with second-layer dependence. 1968 (reprinted from *Journal of Geology*, v. 75, no. 6, p. 743-746).
- \*R 1968-L Surface area of montmorillonite from the dynamic sorption of nitrogen and carbon dioxide. 1968. 9 p., 1 figure, 4 tables (reprinted from *Clays and Clay Minerals*, v. 16, p. 83-91).
- \*R 1968-W Clay mineral composition, a source indicator of midwest loess. 1968. 6 p. (reprinted from *The Quaternary of Illinois*, University of Illinois College of Agriculture Special Publication 14, p. 35-40. 1968).
- \*R 1968-X Past and present uses of Illinois Quaternary materials. 1968 (reprinted from *The Quaternary of Illinois*, University of Illinois College of Agriculture Special Publication 14, p. 150-156).
- \*R 1969-N Surface area of vermiculite with nitrogen and carbon dioxide as adsorbates. 1969. 5 p., 1 figure, 1 table (reprinted from *Clays and Clay Minerals*, v. 17, p. 205-209).
- \*R 1970-A A flint clay in Sangamon County, Illinois. 1970. 13 p., 3 figures, 1 table (reprinted from *Proceedings of the International Clay Conference*, Tokyo, v. 1, p. 291-303, 1969).
- \*R 1971-A Random clay powders prepared by spray-drying. 1970. 7 p., 5 figures (reprinted from *American Mineralogist*, v. 55, no. 5, p. 1780-1786).
- \*R 1971-F Scanning electron microscopy of clays and clay minerals. 1971. 6 p., 14 figures (reprinted from *Clays and Clay Minerals*, v. 19, no. 1, p. 49-54, 1971).
- \*R 1973-G An elutriator method for particle-size analysis with quantitative silt fractionation. 1973. 6 p., 1 figure, 2 tables (reprinted from *Journal of Sedimentary Petrology*, v. 43, no. 2, p. 544-549).
- R 1976-B Clay mineralogy of modern alluvial muds of the Mississippi River basin. 1976. 37 p., 19 figures, 8 tables (reprinted from *Bulletin des Centres de Recherche*, v. 9, no. 2, p. 353-389, 1975). \$1.00.
- R 1978-F Petrology of the New Albany Shale Group (upper Devonian and Kinderhookian) in the Illinois Basin: a preliminary report. 1978. 27 p., 5 figs, 5 plates, 8 tables (reprinted from *Proceedings of the First Eastern Gas Shales Symposium*, Morgantown, WV, 17-19 October 1977, p. 239-265). \$1.00.
- \*R 1980-D Stratigraphic relationships of the New Albany Shale Group (Devonian-Mississippian) in Illinois. 1980 [reprinted from *Preprints of the Second Eastern Gas Shales Symposium (METC/SP-7816 v. 1)*, U.S. Dept. of Energy, Morgantown, WV, p. 443-454, October 1978].
- R 1980-N Paleoenvironment of the New Albany Shale Group (Devonian-Mississippian) of Illinois. 1980 (reprinted from *Journal of Sedimentary Petrology*, v. 50, no. 3, p. 767-780, 1980). \$1.00.
- R 1981-B Mössbauer studies of illites and heat-treated illite as related to coal-conversion processes. 1981 (reprinted from *Fuel*, v. 59, p. 767-771). \$1.00.
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- ings of the Technical Program: Powder and Bulk Solids Handling and Processing. Cahners Exposition Group, Des Plaines, Illinois, p. 327-338). \$1.00.
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- \*RI 72 Petrographic and ceramic properties of Pennsylvanian shales of Illinois. 1941. 15 p., 10 figures (reprinted from Journal of the American Ceramic Society, v. 24, no. 1, p. 23-28).
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- RI 85 Differential thermal analyses of clay minerals and other hydrous materials. 1942. 34 p., 14 figures, reprinted 1953 (reprinted from American Mineralogist., v 27, no. 11 and 12, 1942). \$0.90.
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- EGN 50 Petrographic properties of carbonate rocks related to their sorption of sulfur dioxide. 1971. 37 p., 12 figures, 12 tables. \$1.25.
- \*EGN 55 Use of carbonate rocks for control of sulfur dioxide in flue gases. Part I. Petrographic characteristics and physical properties of marls, shells, and their calcines. 1972. 61 p., 6 plates, 20 figures, 8 tables, appendix. *Descriptions of marls from Ohio, New York, Pennsylvania, Virginia, Indiana, Michigan, Wisconsin, Minnesota, and Illinois; descriptions of shells from Florida, Louisiana, and Alabama.*
- EGN 68 Lake marls, chalks, and other carbonate rocks with high dissolution rates in SO<sub>2</sub>-scrubbing liquors. 1974. 22 p., 1 plate, 10 figures, 2 tables. *Summary of results of testing; table and location map of sample sources.* \$1.25.
- \*GB 1 Field conference on Niagaran reefs in the Chicago region. 1950. Field trip for Thirty-fifth Annual Meeting of American Association of Petroleum Geologists, 23 p., 11 figures.
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- \*R 1955-N The occurrence of magnesium calcite in nature. 1955 (reprinted from *Geochimica et Cosmochimica Acta*, v. 7, no. 5, p. 212-230).
- \*R 1956-G Properties of calcium and magnesium carbonates and their bearing on some uses of carbonate rocks. 1955. 74 p., 1 table. *Extensive bibliography.*
- \*R 1957-B Biocalcarenes in some Upper Pennsylvanian limestones in Illinois. 1957 (reprinted from Transactions of the Illinois State Academy of Sciences, 1956, v. 49, p. 137-142).
- \*R 1957-H Mineralogy of some Pennsylvanian carbonate rocks of Illinois. 1957 (reprinted from Journal of Sedimentary Petrology, v. 27, no. 1, p. 56-63, 1956).
- \*R 1958-D Relation between lattice constants and composition of the Ca-Mg carbonates. 1958 (reprinted from American Mineralogist, v. 43, no. 1-2, p. 84-101).
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- \*R 1963-P Carbonate mineralogy. 1963 (reprinted from Subsurface Geology of Eniwetak Atoll: U.S. Geological Survey Professional Paper 260-BB, p. 1048-1053, 1065-1066).
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- \*R 1973-0 Petrographic characteristics and physical properties of marls, chalks, shells, and their calcines related to desulfurization of flue gases (reprinted from Final Report to Control Systems Laboratory of U.S. Environmental Protection Agency. Contract 68-02-0212. 114 p., 1973). *Includes samples described in EGN 55 and chalks from Alabama, Nebraska, Kansas, Texas, and Arizona.*
- R 1977-C Behavior of dolomite in adsorption of  $\text{H}_2\text{S}$  from fuel gas. 1977 (reprinted from World Mining and Metals Technology, v. 1, p. 168-188, 1976). *Investigations by x-ray diffraction, SEM, and microprobe of dolomite and half-calcined dolomite reacted with dilute  $\text{H}_2\text{S}$  gas stream.* \$1.00.
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- \*RI 164 Water soluble salts in limestones and dolomites. 1953. 16 p., 1 figure, 7 tables (reprinted from *Economic Geology*, v. 48, p. 97-112). *Fluid inclusions in Illinois limestones and dolomites and their probable composition*.
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- \*RI 184 Illinois building stones. 1955. 25 p., 12 figures. *Limestone, dolomite, marble, and sandstone*.
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- \*RI 24 Progress report on the study of southern Illinois silica as a pottery material. 1932. 7 p.
- RI 47 Decolorization of southern Illinois silica. 1937. 35 p., 14 figures, 6 tables. *Methods, costs, efficiency, corrosion problems*. \$0.90.
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- \*R 1968-X Past and present uses of Illinois Quaternary mineral materials. 1968 (reprinted from *The Quaternary of Illinois*, University of Illinois College of Agriculture Special Publication 14, p. 150-156).
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- RI 102 The bonding action of clays. Part I. in green molding sands. 1945. 55 p., 20 figures, 8 tables (in cooperation with the University of Illinois Engineering Experiment Station and Illinois Clay Products Co., Joliet, Illinois). *See RI 110*. \$0.90.
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- \*C 179 Short papers on geologic subjects. 1952. (2) Notes on the Illinois "Lafayette" gravel. p. 95-108, 10 figures, 6 tables (reprinted from Transactions of the Illinois State Academy of Sciences, v. 44, p. 85-128, 137-151. 1951). *Particle size, pebble counts, shape, roundness, polish, and fossils.*
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- C 531      Geology for planning in Boone and Winnebago Counties. 1984. 69 p., 21 figures, 7 tables, 3 plates. *Discussion of sand and gravel resources of Boone and Winnebago Counties.* \$6.75.
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- \*IMN 1 Capsule report: Heavy minerals in Illinois glacial sands. 1954. p. 2-3. *Brief discussion of content of heavy minerals in surficial sands of Illinois, based on analyses of 18 samples from various sources.*
- \*IMN 3 Trace elements and potash in some Illinois gravels. 1956. p. 2-3, 4 tables.
- \*IMN 8 Origin of Illinois sand and gravel deposits. 1958. 9 p., 16 figures. *A simple, brief account of the origin of Illinois sand and gravel deposits.*
- \*IMN 10 Recent price and cost trends relating to stone, sand, and gravel production in Illinois. 1959. 4 p., 2 figures.
- IMN 38 Kankakee dune sands as a commercial source of feldspar. 1969. 17 p., 5 figures, 4 tables. \$1.25.
- IMN 42 An investigation of sands on the uplands adjacent to the Sangamon River floodplain: possibilities as a "blend sand" resource. 1970. 10 p., 3 figures, 3 tables, index. \$1.25.
- IMN 43 Lower Mississippi River terrace sands as a commercial source of feldspar. 1970. 18 p., 3 figures, 3 tables. \$1.25.
- IMN 46 Sideritic concretions in Illinois shale, gravel, and till. 1972. 17 p., 6 figures, 2 tables. \$1.25.
- IMN 59 The distribution of physical properties of chert gravel in Pike County, Illinois. 1974. 21 p., 7 figures, 3 tables, appendix. *Resources of Cretaceous Hadley gravel and Pleistocene-Holocene stream-valley gravels for use as construction aggregate. Includes data on roundness, abrasion resistance, soundness, water absorption, specific gravity, and chemical composition; maps show distribution of gravel types.* \$1.25.
- IMN 82 Application of sedimentology to development of sand and gravel resources in McHenry and Kane Counties, northeastern Illinois. 1981. 17 p., 13 figures. \$0.25.
- IMN 88 Geology of sand and gravel aggregate resources of Illinois. 1983. 10 p., 9 figures, 1 table. *Overview of sand and gravel aggregate resources in Illinois.* \$1.25.
- IMN 91 Directory of Illinois stone, sand and gravel producers. 1985. 161 p. \$1.25.
- IMN 102 Proceedings of the 23rd Forum on the Geology of Industrial Minerals. 1989. Effects of rock types in Illinois gravels on freeze-thaw test beams. p. 71-81, 9 figures. 4 tables. \$4.50.
- \*R 1960-J Cretaceous sedimentation in upper Mississippi embayment. 1960 (reprinted from American Association of Petroleum Geologists Bulletin, v. 44, no. 9, p. 1473-1504).
- \*R 1964-C A rapid visual method for estimating sedimentary parameters. 1964 (reprinted from Journal of Sedimentary Petrology, v. 33, no. 4, p. 831-843, 1963).
- \*R 1967-J A rapid method for determining weight percentages of unsieved heavy minerals. 1967. 8 p., 3 figures, 6 tables (reprinted from Journal of Sedimentary Petrology, v. 37, no. 2, p. 521-529, 1967) *Describes a means of determining the weight percentage of heavy minerals in sands.*
- \*R 1967-L The petrography of some Illinois Pleistocene and recent sands. 1967. 18 p., 4 figures, 2 tables (reprinted from Sedimentary Geology, v. 1, p. 57-75, 1967). *Gives mineral composition of sands.*
- \*R 1968-F Minerals for construction. 1968 (reprinted from Mining Congress Journal, v. 54, no. 2, p. 20-27).
- \*R 1968-I A new method for making pebble counts. 1968. 2 p., 1 figure (reprinted from Journal of Sedimentary Petrology, v. 38, no. 1, p. 264-265, 1968). *A means of quantitatively determining the kinds of rocks that compose a sample of gravel.*

Commodities (continued)

- \*R 1968-X Past and present uses of Illinois Quaternary mineral materials. 1968 (reprinted from *The Quaternary of Illinois*, University of Illinois College of Agriculture Special Publication 14, p. 150-156).
- \*R 1970-L A technique for the rapid determination of the light minerals of detrital sands. 1970. 3 p. (reprinted from *Journal of Sedimentary Petrology*, v. 40, no. 2, p. 759-761).
- \*R 1973-G An elutriator method for particle size analysis with quantitative silt fractionation. 1973 (reprinted from *Journal of Sedimentary Petrology*, v. 43, no. 2, p. 544-549).
- \*RI 57 Fine-grained molding sand resources of northern Illinois: a preliminary investigation. 1939. 53 p., 5 figures. *Sand for nonferrous and gray iron castings, especially in Cook, Henry, Jo Daviess, Mason, and Whiteside Counties; sieve tests.*
- \*RI 79 Feldspar in Illinois sands—a study of resources. 1942. 87 p., 13 figures, 5 tables. *Occurrence of sands, feldspar content, and sieve tests.*

Sandstone

- \*B 53 Geology and economic resources of the St. Peter Sandstone in Illinois. 1928. 175 p., 3 plates, 43 figures, 15 tables. *Resources, distribution, mineralogy, sieve tests, and uses.*
- \*C 256 Geology and petrology of the Anvil Rock Sandstone of southern Illinois. 1958. 49 p., 2 plates, 14 figures, 5 tables.
- \*C 280 Visual estimates of grain size distribution in some Chester sandstones. 1959. 43 p., 14 figures, 4 tables. appendix.
- C 316 Geology and petrology of the Trivoli Sandstone in the Illinois Basin. 1961. 31 p., 1 plate, 15 figures. \$2.75.
- C 331 Chemical and physical character of the Pennsylvanian sandstones in central Illinois. 1962. 43 p., 5 figures, 11 tables, appendix. *Deposits, 90 sieve tests, 71 chemical analyses, heavy minerals, clay minerals, and fusion tests.* \$1.75.
- \*C 340 Late Mississippian sandstones of Illinois. 1962. 36 p., 4 plates, 14 figures, 4 tables.
- \*IMN 1 News of the Industrial Minerals Division. 1954. p. 1-2. *Contains a brief statement about a study of potash feldspar in the Glenwood Formation near Oregon, Illinois.*
- RI 188 Sandstone resources of extreme southern Illinois—a preliminary report. 1955. 21 p., 2 plates, 2 figures, 7 tables. *Sieve tests of 65 samples from 30 outcrops; 18 chemical analyses; uses.* \$0.90.

Uranium, Thorium, Rare Earths, Beryllium

- C 200 Preliminary report on uranium in Hardin County, Illinois. 1955. 22 p., 1 figure, 5 tables. *No samples contained more than 0.1 percent  $U_3O_8$ .* \$1.75.
- C 203 Uranium in Illinois black shales. 1955. 15 p., 1 figure, 4 tables. *None of the 175 samples tested met minimum requirements for ore.* \$1.75.
- \*IMN 11 Rare earth and trace element content of an unusual clay on Hicks Dome in Hardin County, Illinois. 1960. 6 p., 1 figure, 3 tables.
- IMN 98 Subsurface geochemical investigation in western and southern Illinois: a pilot study. 1987. 45 p., 17 figures, 3 tables, appendix. *Abundances of anomalous metals suggest regional targets for exploration.* \$1.25.
- R 1981-K Bertrandite at Hicks Dome, Hardin County, Illinois. 1981 (reprinted from *Transactions of the Illinois State Academy of Science*, v. 73, no. 1, p. 1-13, 1980). \$1.00.

## Zinc and Lead

- \*B 21 Lead and zinc deposits of northwestern Illinois. 1914. 120 p., 22 plates, 13 figures. *Geology, ore deposits, and prospects.*
- \*B 26 Geology and geography of the Galena and Elizabeth Quadrangles. 1916. 233 p., 25 plates, 50 figures. *Geology, mineral resources, and development of Jo Daviess County, including history of mining.*
- \*C 214 Geologic structure map of northwestern Illinois zinc-lead district. 1956. 7 p., 1 plate, 3 figures. *Map scale, 2 inches = 1 mile.*
- C 499 Trace elements in coal: occurrence and distribution. 1977. 154 p., 79 figures, 37 tables, appendix, index. *Minor element, trace element, and standard analyses on 276 coal samples from various parts of the Illinois Basin and from coal-producing areas in other states. Statistical analyses of data.* \$1.75.
- \*C/G 1981-3 Geology and geochemistry of sphalerite in coal. 1981. 204 p., 7 plates, 37 figures, 12 tables.
- \*IMN 5 Relation of sulfate and chloride to ore deposits in the Ordovician rocks of Jo Daviess County. 1957. p. 3-6, 1 figure. *No relation shown by tests of surface rocks.*
- \*IMN 7 Outlying occurrences of galena, sphalerite, and fluorite in Illinois. 1957. 5 p. *Occurrences near Alto Pass and Anna in Union County, and in Hancock and Kendall Counties.*
- IMN 71 Abundance and recovery of sphalerite and fine coal from mine waste in Illinois. 1979. 11 p., 10 figures, 5 tables. \$1.25.
- IMN 74 The abundance of zinc and cadmium in sphalerite-bearing coals in Illinois. 1980. 28 p., 16 figures, 7 tables, appendix. \$1.25.
- IMN 98 Subsurface geochemical investigation in western and southern Illinois: a pilot study. 1987. 45 p., 17 figures, 3 tables, appendix. *Abundances of anomalous metals suggest regional targets for exploration.* \$1.25.
- \*R 1960-I A structural analysis of the northwestern Illinois zinc-lead district. 1960. 5 p., 2 figures (reprinted from Transactions of the Illinois State Academy of Science, v. 53, no. 1 and 2, p. 20-24).
- \*R 1961-J Mineralogy and the question of zoning northwestern Illinois zinc-lead district. 1961. 17 p., 5 figures, 3 tables (reprinted from Economic Geology, v. 56, p. 132-148).
- \*R 1968-O Glaciation as a possible cause of mineral deposition. 1968 (reprinted from Economic Geology, v. 63, no. 4, p. 390-400).
- R 1976-E Sphalerite in coals from the Illinois Basin. 1976. 14 p., 13 figures, 2 tables (reprinted from Economic Geology, v. 71, no. 3, p. 613-624). *Data on sphalerite in Illinois coals; description and mineralogy of sphalerite occurrences in northwestern portion of Illinois coal basin.* \$1.00.
- R 1977-H Characterization by scanning electron microscopy of mineral matter in residues of coal liquefaction. 1977. 6 p., 9 figures, 2 tables (reprinted from Scanning Electron Microscopy, v. 1, p. 95-100, 1977) *Sphalerite remains unaltered in liquefaction residues.* \$1.00.
- \*RI 116 Geological aspects of prospecting and areas for prospecting in the zinc-lead district of northwestern Illinois. 1946. 48 p., 2 plates, 7 figures, 2 tables. *Includes descriptions of many mining properties.*
- \*RI 124 Geological structure of the zinc-lead district of northwestern Illinois. 1947. 15 p., 7 plates.
- RI 179 Geochemical prospecting in the zinc-lead district of northwestern Illinois. 1955. 11 p., 2 figures. *Tests of soils by dithizone method.* \$0.90.

Commodities (continued)

- RI 210 Crève lead-zinc deposits of northwestern Illinois. 1959. 49 p., 6 plates, 11 figures, appendix. *Characteristics, distribution, mineralogy, origin, mines, and future possibilities.* \$5.75.

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AGGREGATE RESOURCE MAPS

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Blueline prints of maps showing limestone or sand and gravel resources for areas of Illinois:

- Road Materials Resource Maps. 1930-32, 1935. County maps showing limestone outcrops and sand and gravel resources. Maps are available for most counties. Scale: 1:63,360 (1 inch = 1 mile). \$2.00 each.
- Preliminary Map of Limestone Outcrops. 1950. State map. Scale: 1:1,000,000 (1 inch = 16 miles). \$2.00.
- Sand and Gravel Resources of Illinois. 1960. State map. Scale: 1:1,000,000 (1 inch = 16 miles). \$2.00.

County sand and gravel maps available separately:

Champaign (1960), Cook (northwestern part) (1962), Du Page (1962), Kane (1976), Kendall (1962), Lake (1960), McHenry (1976). Scale: 1:62,500 (1 inch = 1 mile). \$2.00 each.

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GEOLOGY, MINERALOGY, AND MINERAL ECONOMICS

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- B 92 Bibliography and index of Illinois geology through 1965. 1968. 373 p. \$4.75.
- \*B 94 Pleistocene stratigraphy of Illinois. 1970. 204 p., 3 plates, 14 figures, 7 tables, glossary, index.
- B 95 Handbook of Illinois stratigraphy. 1975. 261 p., 176 figures, 3 tables, index. \$4.75.
- \*C 29 Synthetic cryolite. 1938. 3 p. (reprinted from Transactions of the Illinois State Academy of Sciences, v. 30, no. 2, p. 180-182). *Uses and production of cryolite from fluorspar.*
- C 209 Unpublished reports on open file. II. Industrial Minerals. 1956. 8 p. *Briefly describes reports dating from 1918, available for consultation at the Geological Survey. Subjects include occurrence or uses of the following minerals or products: ocher, potash, shale, silica (tripoli), ganister, novaculite, cement-making materials, fluorspar, limestone, zinc and lead ores, clay, gravel, and organic material in limestones.* \$1.75.
- C 402 Heavy minerals in sands along the Wabash River. 1966. 22 p., 3 figures, 5 tables. \$1.75.
- C 408 One-dimensional disorders in carbonates. 1967. 61 p., 3 figures, 5 tables, appendix. \$1.75.
- C 428 Heavy minerals of the Cretaceous and Tertiary sands of extreme southern Illinois. 1968. 22 p., 5 figures, 6 tables. \$1.75.
- \*C 490 Glacial drift in Illinois: thickness and character. 1975. 35 p., 2 plates, 5 figures, 1 table, appendix. Includes map at scale of 1:500,000 showing drift thickness in Illinois.

- C 494 The gravity field and tectonics of Illinois. 1976. 28 p., 4 plates, 14 figures, 2 tables. \$6.75.
- C 495 An aeromagnetic survey of southwestern Illinois. 1976. 28 p., 1 plate, 11 figures, 2 tables. \$3.75.
- C 499 Trace elements in coal: occurrence and distribution. 1977. 154 p., 79 figures, 37 tables, appendix, index. \$1.75.
- \*IMN 1 Capsule report: Heavy minerals in Illinois glacial sands. 1954. p. 2-3. *Brief discussion of content of heavy minerals in surficial sands of Illinois, based on analyses of 18 samples from various sources.*
- \*IMN 6 Trend in fuel uses in selected industrial mineral products, 1947 and 1954. 1957. 4 p., 3 tables. *Trends in cement, glass, and clay products manufacture.*
- \*IMN 11 Rare earth and trace element content of an unusual clay on Hicks Dome in Hardin County, Illinois. 1960. 6 p., 1 figure, 3 tables.
- IMN 19 Binding materials used in making pellets and briquets. 1964. 46 p. *A literature review; extensive bibliography.* \$1.25.
- IMN 21 Illinois natural resources—an industrial development asset. 1964. 5 p. \$1.25.
- \*IMN 25 Annotated selected list of industrial minerals publications. 1966. 16 p.
- IMN 44 Analyses of some Illinois rocks for gold. 1970. 14 p., 1 figure, 4 tables. \$1.25.
- IMN 46 Sideritic concretions in Illinois shale, gravel, and till. 1971. 17 p., 6 figures, 1 table. \$1.25.
- \*IMN 47 Selected and annotated list of industrial minerals publications of the Illinois State Geological Survey. 1972. 24 p.
- IMN 55 The energy crisis and its potential impact on the Illinois clay products industry. 1974. 15 p., 2 figures, 1 table, appendix. \$1.25.
- IMN 57 Electric utility plant flue-gas desulfurization: a potential new market for lime, limestone, and other carbonate materials. 1974. 19 p., 6 figures, 2 tables. \$1.25.
- IMN 61 Behavior of coal ash in gasification beds of ignifluid boilers. 1975. 25 p., 5 plates, 3 figures, 4 tables. *Discusses character and mineralogy of coal ash from fluidized-bed combustion.* \$1.25.
- IMN 69 Industrial minerals publications of the Illinois State Geological Survey through December 1978. 1979. 13 p. \$1.25.
- IMN 102 Proceedings of the 23rd Forum on the Geology of Industrial Minerals. 1989. 105 p. *Includes articles on the history, geology, use, and economics of Illinois industrial minerals.* \$4.50.
- \*EGN 16 Urban expansion—an opportunity and a challenge to industrial mineral producers. 1967. 19 p., 15 figures, 1 table.
- EGN 49 Environmental quality control and minerals. 1971. 10 p., 6 figures. \$1.25.
- \*EGN 70 Land resource—its use and analysis. 1974. 6 p.
- \*EGN 73 Illinois geology from space. 1975. 36., 19 figures, 2 tables, appendix. *Discusses availability and usefulness of ERTS-I images of Illinois.*
- ES 5 Guide to rocks and minerals of Illinois. 1959. 40 p., 11 figures, \$1.00.
- ES 8 Industrial minerals and metals of Illinois. 1965. 48 p., 23 figures. *A nontechnical account of the formation, occurrence, production, and uses of 22 materials.* \$1.00.
- \*ES 9 Inside Illinois—mineral resources. 1965. 31 p., 20 figures.
- \*ES 10 History of Illinois mineral industries. 1968. 30 p., 11 figures.
- MEB 12 Mineral resources and mineral industries of the East St. Louis region, Illinois. 1966. 32 p., 24 figures, 4 tables. \$1.25.
- MEB 13 Mineral resources and mineral industries of the extreme southern Illinois region. 1966. 26 p., 14 figures, 2 tables. \$1.25.

- \*MEB 14 Mineral resources and mineral industries of the southeastern Illinois region. 1966. 36 p., 26 figures, 3 tables.
- \*MEB 15 Mineral resources and mineral industries of the east-central Illinois region. 1967. 39 p., 27 figures, 4 tables.
- MEB 17 Mineral resources and mineral industries of the Springfield region, Illinois. 1967. 35 p., 25 figures, 4 tables. \$1.25.
- MEB 19 Mineral resources and mineral industries of the western Illinois region. 1967. 35 p., 24 figures, 4 tables. \$1.25.
- MEB 20 Mineral resources and mineral industries of the northwestern Illinois region. 1967. 25 p., 16 figures, 2 tables. \$1.25.
- MEB 22 Mineral resources and mineral industries of the northeastern Illinois region. 1968. 28 p., 21 figures, 2 tables. \$1.25.
- \*R 1959-E Current progress in silicate structures. 1959 (reprinted from Sixth National Conference on Clays and Clay Minerals Proceedings, National Academy of Sciences—National Research Council Special Publication, p. 18-25).
- \*R 1959-S Search for mineral adequacy. 1959 (reprinted from *Journal of Geography*, v. 58, no. 8, p 385-399).
- \*R 1961-L Separation of clay minerals from carbonate rocks by using acid. 1961 (reprinted from *Journal of Sedimentary Petrology*, v. 31, no. 1, p. 123-129).
- \*R 1964-C A rapid visual method for estimating sedimentary parameters. 1964 (reprinted from *Journal of Sedimentary Petrology*, v. 33, no. 4, p 831-843, 1963).
- \*R 1964-D Preparation of oriented clay mineral aggregates from oil saturated sandstones (reprinted from *Journal of Sedimentary Petrology*, v. 33, no. 4, p. 966-972, 1963).
- R 1966-J Calcium and bromine contents of natural waters. 1966. 2 p., 1 figure (reprinted from *Science*, v. 153, no. 3744, p. 1637-1638). \$1.00.
- \*R 1967-J A rapid method for determining weight percentages of unsieved heavy minerals. 1967 (reprinted from *Journal of Sedimentary Petrology*, v. 37, no. 2, p. 521-529).
- \*R 1968-F Minerals for construction. 1968. 6 p., 2 figs, 5 tables (reprinted from *Mining Congress Journal*, v. 54, no. 2, p. 20-27).
- \*R 1968-I A new method for making pebble counts. 1968. 2 p., 1 figure (reprinted from *Journal of Sedimentary Petrology*, v. 38, no. 1, p. 264-265).
- \*R 1968-O Glaciation as a possible cause of mineral deposition. 1968 (reprinted from *Economic Geology*, v. 63, no. 4, p 390-400).
- \*R 1968-W Clay mineral composition, a source indicator of Midwest loess. 1968. 6 p. (reprinted from *The Quaternary of Illinois*, University of Illinois College of Agriculture Special Publication 14, p. 35-40).
- \*R 1968-X Past and present uses of Illinois Quaternary mineral materials. 1968. 6 p., 5 figures (reprinted from *The Quaternary of Illinois*, University of Illinois College of Agriculture Special Publication 14, p. 150-156, 1968). *A review covering clay, sand and gravel, feldspar-bearing sand, peat, natural bonded molding sand, glacial drift gas, boulders, marl, tufa, iron ore, and saltpeter.*
- \*R 1970-L A technique for the rapid determination of the light minerals of detrital sands. 1970. 3 p. (reprinted from *Journal of Sedimentary Petrology*, v. 40, no. 2, p. 759-761).
- R 1970-P Research and service of the Illinois State Geological Survey. 1970. p 14-20 (reprinted from Annual Report, Department of Registration and Education, 23 p., 1970). \$1.00.
- R 1977-H Characterization by scanning electron microscopy of mineral matter in residues of coal liquefaction. 1977. 6 p., 9 figures, 2 tables (reprinted from *Scanning Electron Microscopy*, v. 1, p. 95-100, 1977). Discusses behavior of mineral matter in coal

- during liquefaction process. Sphalerite remains unaltered in liquefaction processes. \$1.00.
- R 1977-M Fluoride content of clay minerals and argillaceous earth materials (reprinted from *Clays and Clay Minerals*, v. 25, p 278-284). \$1.00.
- R 1978-P Minerals in the economy of Illinois. *U.S. Bureau of Mines State Mineral Profile 42 (prepared by the Illinois State Geological Survey with the U.S. Bureau of Mines)*. \$1.00.
- R 1979-D Minerals in the economy of Illinois. 1979. *U.S. Bureau of Mines State Mineral Profile (prepared by the Illinois State Geological Survey with the U.S. Bureau of Mines)*. \$1.00.
- R 1980-R Factors favoring expanded underground mining of limestone in Illinois. 1980 (reprinted from *Mining Engineering*, v. 32, no. 10, p. 1497-1504, 1980). \$1.00.
- R 1981-K Bertrandite at Hicks Dome, Hardin County, Illinois. 1981 (reprinted from *Transactions of the Illinois State Academy of Sciences*, v. 73, no. 1, p. 1-13, 1980). \$1.00.
- R 1982-C Relation of process mineralogy to energy issues. 1982. 3 p. (reprinted from *Process Mineralogy: Extractive Metallurgy, Mineral Exploration, Energy Resources*, Proceedings of the 110th Annual Meeting, American Institute of Mining, Metallurgical and Petroleum Engineers (AIME), Chicago, Illinois, February 22-26, 1981). *Brief discussion of potential opportunities for secondary recovery of minerals from processing of energy minerals, including coal, oil shale, tar sands, and uranium ores*. \$1.00.
- Guide  
leaflets A series of geological science field trip guide leaflets providing one-day tours of the geological features in a limited area. Approximately 80 leaflets are available for various parts of the state. Most of them describe the mineral resources in the area of study. \$1.00 each.
- Quadrangle  
reports The Illinois State Geological Survey has issued many reports on specific quadrangles of the state, areas approximately 13 miles wide and 18 miles long. Each report considers the geology and mineral resources of one such area. Additional information on these reports is available from the Information Office, Illinois State Geological Survey, Natural Resources Building, 615 E. Peabody Drive, Champaign, Illinois 61820; telephone (217) 333-4747.

## PRODUCER DIRECTORIES

- IMN 96 Directory of Illinois mineral producers, 1986-1987. 1987. 151 p., 3 figures, 2 tables. \$1.25.
- IMN 103 Directory of Illinois mineral producers, 1988-89. 1990. 134 p., 2 figures, 2 tables. \$1.25.
- \*MEB 18 Directory of Illinois sand and gravel producers. 1967. 28 p.
- \*MEB 23 Directory of Illinois mineral producers. 1968. 10 p.
- \*MEB 25 Directory of Illinois limestone and dolomite producers. 1969. 27 p.
- MEB 29 Directory of Illinois mineral producers. 1971. 12 p. *Includes producers of cement, clay and clay products, fluorspar, lead and zinc, natural bonded molding sand, tripoli, ganister, and peat*. \$1.25.

# STATEWIDE ECONOMIC SUMMARIES

- C 455 Mineral production in Illinois in 1969. 1971. 24 p., 3 figures, 17 tables. \$1.75.
- IMN 48 Illinois mineral production by counties, 1970. 1972. 14 p., 14 tables, 1 map. \$1.25.
- \*IMN 51 Illinois mineral production by counties, 1971. 1973. 15 p., 14 tables, 1 map.
- \*IMN 58 Illinois mineral industry in 1972 and review of preliminary mineral production data for 1973. 1974. 54 p., 14 figures, 39 tables.
- IMN 62 Illinois mineral industry in 1973 and review of preliminary mineral production data for 1974. 1975. 48 p., 19 figures, 38 tables. \$1.25.
- IMN 64 Directory of Illinois mineral producers, 1974. 1976. 119 p., 7 figures, 3 tables. \$1.25.
- IMN 66 Illinois mineral industry in 1974. 1977. 40 p., 14 figures, 31 tables. \$1.25.
- IMN 68 Illinois mineral industry in 1975. 1977. 39 p., 14 figures, 34 tables. \$1.25.
- IMN 70 Illinois mineral industry in 1976 and review of preliminary mineral production data for 1977. 1979. 38 p., 15 figures, 35 tables. \$1.25.
- IMN 75 Illinois mineral industry in 1977 and review of preliminary mineral production data for 1978. 1980. 36 p., 14 figures, 34 tables. \$1.25.
- IMN 79 Illinois mineral industry in 1978 and review of preliminary mineral production data for 1979. 1981. 35 p., 14 figures, 34 tables. \$1.25.
- IMN 86 Illinois mineral industry in 1979/1980 and review of preliminary mineral production data for 1981. 1983. 40 p., 14 figures, 35 tables. \$1.25.
- IMN 93 Illinois mineral industry in 1981-83 and review of preliminary mineral production data for 1984. 1985. 38 p., 14 figures, 30 tables. \$1.25.
- IMN 95 Illinois mineral industry in 1984 and review of preliminary mineral production data for 1985. 1986. 44 p., 11 figures, 24 tables. \$1.25.
- IMN 99 Illinois mineral industry in 1985 and review of preliminary mineral production data for 1986. 1988. 45 p., 12 figures, 25 tables. \$1.25.
- IMN 100 Illinois mineral industry in 1986 and review of preliminary mineral production data for 1987. 1989. 40 p., 11 figures, 25 tables. \$1.25.
- IMN 101 Illinois mineral industry in 1987 and review of preliminary mineral production data for 1988. 1989. 43 p., 13 figures, 25 tables. \$1.25.
- \*MEB 16 Illinois mineral production by counties, 1965. 1967. 10 p., 12 tables, 1 map.
- \*MEB 21 Illinois mineral production by counties, 1966. 1968. 11 p., 1 map.
- \*MEB 24 Illinois mineral production by counties, 1967. 1969. 27 p.
- \*MEB 27 Illinois mineral production by counties, 1968. 1970. 12 p., 11 tables, 1 map.
- \*MEB 28 Illinois mineral production by counties, 1969. 1971. 13 p., 13 tables. 1 map.
- R 1978-P Minerals in the economy of Illinois. 1978. *U.S. Bureau of Mines State Mineral Profile 42 (prepared by the Illinois State Geological Survey with the U.S. Bureau of Mines)*. \$1.00.
- R 1979-D Minerals in the economy of Illinois. 1979. *U.S. Bureau of Mines State Mineral Profile (prepared by the Illinois State Geological Survey with the U.S. Bureau of Mines)*. \$1.00.





